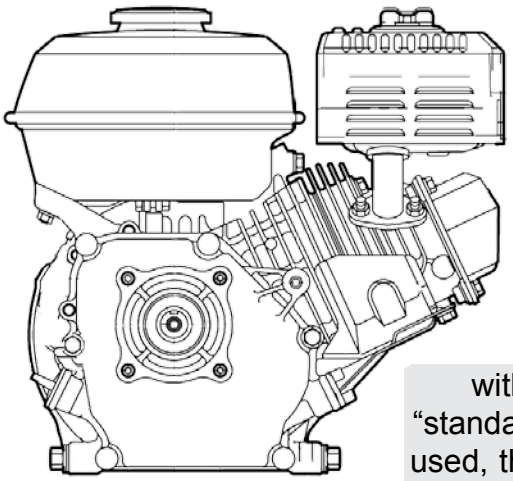
Honda GX 160 Technical Regulations



1. GENERAL

The scrutineer will pay special attention to ensure that the finish of all components match those of the standard unit and reserves the right to compare any part from competitors' engines directly with a standard part as supplied by Honda (UK). Unless competitors have gone out of their way to source alternative parts, their engines should automatically comply with this rule. Furthermore, competitors should note that the term "standard" refers not only to the components used but also to the number used, their position and function and the manner in which the engines are assembled. Please remember that save for the changes specifically mentioned in these regulations the engines must be completely standard unmodified, and that all components will remain in place unless this document specifically states that they are allowed to be removed. No specific coating procedures are allowed on any internal or external surface of the engine. Carbon or gasket residue removal must be achieved by use of chemical agents only, to preserve original finishes, which must be apparent over the complete machined area (see Appendix 2). The fasteners on the engines may be drilled for the purposes of lock wiring. Replacement of external fasteners with non-Honda fasteners is only permitted when the replacement fastener improves safety or when the standard Honda fastener is not readily available. A thread recovery procedure is acceptable providing that the system and replacement fixing used are of no different size or pitch to the original and therefore offer no mechanical advantage over the original fixing, or alter the position of the original fixing.

2. DEFINITIONS

2a. The standard, unmodified component

This means that the component has not had its substance altered in any way. It has had no material removed from it or added to it. It will be of the same, original material. Where appropriate, it should have the manufacturer's original manufacturing process or machining marks on it. It is the component defined as being applicable to the particular engine type.

2b. Engine types

The original QHQ4 engine, to engine number 7664037, shall in this document be called the K engine. The QHQ4 engine from engine number 7664037 onwards shall in this document be called the E engine. The QHQ4 engine with suffix T, from engine number 1000000 onwards shall in this document be called the T engine. This will also include all unified specification engines (GX160UT1 QHQ4 and QHG4). GX160UT2 QHQ4 and GX160RT2-QHG4 engines (T2) will be eligible, with exceptions as notified in the following document.

2c. Legality limit

In general terms, and where not clarified or qualified elsewhere in this document, the legal limit for eligibility purposes shall be deemed to be the service limit as specified by Honda in the most up-to-date Honda Service manual for the particular engine. (http://www.honda-engines-eu.com/en/welcome.html)

shaded area denotes text amended from previous version

COMPONENT BY COMPONENT

3. The fuel tank

It is strongly urged that the engine's integral fuel tank be removed. If this is done then the engine must be fitted with a suitable cover. A standard centrally-mounted fuel tank should then be used, unmodified and this tank and its mounting must be in accordance with manufacturer's instructions. The capacity of this tank must not exceed 7.5 litres, if used for endurance events. Ballast may be added to the tank in order to maintain the maximum capacity. In this instance the kart may be fitted with a pulsed fuel pump(s), which will take a vacuum feed from either the governor rod hole or one drilled in the inlet manifold, tapped to accept a vacuum fitting. Fuel pipes must take a direct route to the carburettor and be safely secured. An extra loop of fuel pipe may be used as a return feed to the tank. One in-line fuel filter of nominal capacity per engine may be fitted, whose dimensions do not exceed circumference of 10cms and length (excluding stubs) of 5cms.

4. Exhaust

The standard exhaust must be used but a unit modified and sealed by an *Agent* may also be used. In this case, the unit will bear a seal applied by an *Agent* and it is the competitor's responsibility to ensure this seal is in place at all times. At any time the modified unit on the engine can be exchanged with one held by the scrutineer, who will then send the competitor's exhaust back to an *Agent* for inspection. If this unit is found to have been tampered with in any way, then the competitor will be penalised retrospectively. No other repair or modification is allowed. Exhaust, Part No 18310-ZH7-V90 or 18310-Z4M-000 can also be used, and modified as above.

The *Agents* currently are: Focus Racing (0178 737 6655) and 7Kart (0192 083 1000)

The heat shield should be in place at all times. Where the original fixings have failed, they can be replaced with a rivet-type thread repair, which can alternatively be welded, in original position.

5. Carburettor

The T1 carburettor must only be used on the T1 engine type, and the T2 carburettor on the T2 engine type, both standard and unmodified. However all carburettors are subject to normal dimensional criteria. Overall length (manifold face to airbox face) is 53.9mm min and bore go / no go gauge is 13.2mm / 13.3mm. Pilot jet size 35 only, the mixture screw tang can be removed. The T1 has 140 stamped on the throttle valve and four small holes just below the mixture screw point. The T2 has 150 stamped on it, with only three holes at the same point. (see Appendix note 1). When used as a Cadet or Junior engine, only the official ABkC restrictor plate (which may be de burred) must be fitted between the carburettor and insulator, and have an opening of no more than 16mm diameter (see p.8). This size may be altered during the year (see p.7). A 2mm hole may be drilled in the tag on the restrictor for the purpose of affixing an official seal. This restrictor is not permitted in Senior engines.

6. Permitted main jets

size 68 (PN 99101-ZF5-0680) size 70 (PN 99101-ZF5-0700)
size 72 (PN 99101-ZF5-0720) size 75 (PN 99101-ZF5-0750)

Emulsion tube must be either part number 16166-ZH8-W50, 16166-ZH-810 or 16166-Z4M-922 (see drawing 1 in Appendix 1). The throttle-actuating arm can be modified to accept an actuating rod onto the throttle butterfly, a method of mounting a throttle actuating cable and a method of mounting a throttle return spring only.

7. Carburettor air box

Must be standard unmodified. The additional silencer, part number 17235-ZE1-831 may be used.

8. Air filter

The original air filter, if used, must have the base washer in place, it can have it's paper or foam or both removed. Alternatively it can be omitted completely or be substituted for another filter. In any case, the plastic outer cover must remain as standard, unmodified and fixed securely in its original position.

9. Spark plugs

Must be standard unmodified from the following list only, no other can be used. The standard Honda resistor spark plug cap - as supplied with the engine - must be used where a non-resistor spark plug is used, otherwise plug cap is free.

Permitted spark plugs

NGK	BPR6ES	BP6ES	BP5ES	BPR5ES
Nippondenso	W20EP-U	W20EPR-U	W16EP-U	W16EPR-U

10. Bodywork / ducting

All of the engine bodywork and ducting must be standard unmodified except for the drilling of a small hole to accept one end of a throttle return spring or security fixing. The pull-cord mechanism must be standard unmodified, although the pull-cord starter may be rotated on its standard mounting holes. All or any of the bodywork / ducting can be painted or chromed.

11. Rocker cover

Rocker cover must be standard unmodified, although it may be painted or chromed. Its valve must be present and in working order. The breather pipe must be in position and intact, of suitable length that it is securely fixed in both the rocker cover and the outlet of the airbox, and have no perforations or leakage points. Cover interchangeable between all engine types.

12. Valve Gear

The valve rocker studs must be standard unmodified. On the T1 engine only, the inlet valve collet (PN 14771-ZE1-000) may be replaced with an exhaust valve collet (PN 14773-ZE1-000) and an exhaust valve rotator (PN 14781-ZE1-000). If this modification is performed to the inlet valve, it is permissible to fit one 8mm washer between the cylinder head and the base of the valve rocker post to raise the post and ensure that the adjuster locknut sits on a full thread. The valve spring used must offer no mechanical advantage over a standard GX140 valve spring (PN14751-ZE1-000) i.e. a force of 5 kg will compress the spring to less than 25mm overall length, or a spring which offers no mechanical advantage over a standard QHG4 spring (PN 14751-ZH8-9400) i.e. a force of 8 kg will compress the spring to less than 18.5mm overall length. Valve rockers, cam followers and pushrods must be standard unmodified.

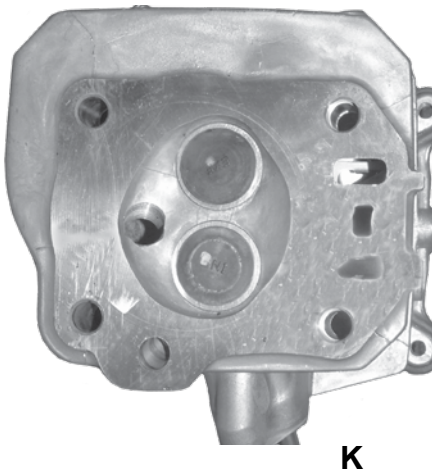
13. Valves

Valves will be standard unmodified. Valve-seat grinding and cutting is allowed, to the single standard profile only (45°) and 30° cut to restore seat width, as specified in the latest Honda manual for the engine type. Valves of T1 and T2 engine are not interchangeable.

25mm	Inlet valve*	26mm
24mm	exhaust valve*	23mm
62.2mm	exhaust valve length*	63.7mm

14. Cylinder head

Will be standard unmodified and measure a minimum of 73.98mm from the rocker cover gasket face to the cylinder head gasket face. Ports must be standard unmodified. The standard de-burring marks and sharp edges should always be present. A maximum measurement of 29.25mm (inlet) and 28.25mm (exhaust) must be present between the cylinder head gasket face and the land surrounding the valve guide (see drawing 4 in appendix 1). Cylinder head of T1 and T2 are not interchangeable.



K

T1

T2

15. Head gasket

Must be standard unmodified and will at all times have a minimum thickness at all points of 0.95mm when used on K, E and T1 engines. Alternatively these engines can use 4 off gasket part number 12251-ZLO-003 which, when measured together at the sealing ring, must have a minimum thickness of 0.95mm. The T2 engine will use one off part number 12251-ZLO-003 which, when measured at the sealing ring, must have a minimum dimension of 0.28mm.

16. Piston

The dished piston must only be used with the cylinder head from the K type engine. The flat-top pistons are interchangeable between the E and T1 type engines only and must not be used in the K type engine or with the K type head. Piston rings will be standard unmodified.

Only standard size rings, (marked 1R, R, T, 1T, NT, 1N/T or N on top ring) can be used. Either the single or three-piece oil control ring can be used on all engine types. The rings must always be free in their grooves to function as designed. T1 and T2 pistons are not interchangeable. The T2 piston is shorter and has an additional curve under the oil ring. The top two piston rings are visually similar to the T1 but the oil control ring is thinner (2mm as against 2.5mm on the T1) and the ring groove in the piston is correspondingly smaller.

Early T1

Late T1

T2

17. Connecting Rod

The standard unmodified unit is interchangeable between K, E and T1 engine types. The connecting rod from the T2 engine must also remain standard, unmodified but will not fit other engine types on its own (but see also section 18).

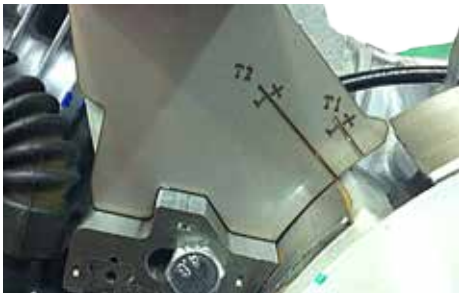
158gr	Piston weight*	140gr
43gr	piston pin weight*	41gr
23.5mm	piston height*	21.4mm
See Appendix 3	con rod length	See Appendix 3
119gr	con rod weight*	123gr
7mm	con rod bolt*	6mm

18. Crankshaft

The governor gear can be removed. The position of the cam gear wheel is free. The standard key must be used on all engine types, but may be modified in accordance with item 19. The crankshafts are interchangeable between K, E and T1 engines only. You cannot transpose complete crank, rod and piston assemblies between T1 and T2 engines. In all instances, the final stroke must not exceed 45.1mm. The T2 crank may be used as a replacement in the T1 engine, but it is not permitted to use the T1 crank in the T2 engine.

19. Flywheel

The flywheel must be standard unmodified and have a minimum weight of 2.2kgs. The T1 and T2 flywheels are not interchangeable. The key may be reduced in width or otherwise modified, but not omitted. The ignition timing must be set/checked with the engine at TDC, and the ABkC-marked template tool in place. The edge of the magnet must not intrude into the split marking the go (✓) and no-go (✗) area of the template (for the particular engine type).



If the output shaft keyway and throw of the crankshaft are aligned then the ABkC-marked location tool can be used to assist with the setting. For accuracy, the crankshaft must be rotated against the location tool in a clockwise direction (flywheel side) before the reading is observed on the template tool. The standard unmodified fan must be used, with all fins in place.

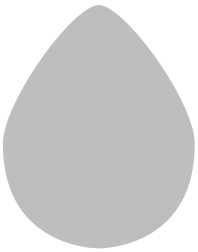
If the output shaft keyway and throw of the crankshaft are misaligned then the location tool cannot be used and in this instance the engine must be positioned at TDC using piston-stop or DTI method and the ABkC-marked template tool used as above.

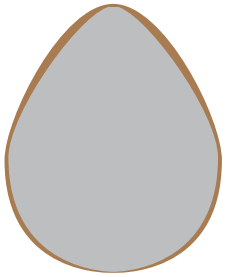
20. Ignition coil

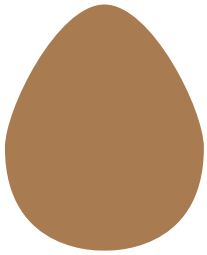
The ignition coil (including ignition lead) will be the standard unmodified unit and is interchangeable between all engine types. The coil mounting bolts must be standard unmodified and use the original mounting positions (see also section 23, welded repairs and dimensions in Appendix 3).

21. Camshaft

The standard unmodified camshaft must be used, the service limits are 27.65mm for the exhaust and 27.60mm for the inlet lobes(T1) and 27.45mm for both lobes (T2). The K, E, and T1 engine can only use the T1 camshaft, the T2 engine can only use the T2 camshaft. The inlet profiles are different between T1 and T2, with the T2 having a longer duration. The difference is easily identifiable with profile gauges or by measuring the open period.







22. Push rods

The steel push rods of the T1 have been replaced with thicker aluminium units for the T2. The pushrods are not interchangeable between T1 and T2.

23. Crankcase

The crankcase can only be modified by the removal of the governor mechanism and in all other respects must be standard unmodified. If completely removed, the hole in the crankcase must be sealed to prevent oil leakage (unless a suitable pulse take-off is used). The crankcase bearings and seals must be standard unmodified.

The bore must be standard only, service limit 68.165mm at all points of the bore. No sleeving or surface material change to the cylinder bore is allowed but honing is permitted. The cylinder mating face must always have the manufacturer's original finishing marks visible. The deck height must be 45.20mm ± 0.3mm (read between the cylinder mating face and the cast face of the piston, in line with the piston pin, with the piston at BDC). Carbon removal is allowed as describe previously.
(See drawing 2 & 3 in Appendix 1).

When measuring a K type engine, 1.3mm should be added to the obtained reading, to accommodate the dish in the piston.

Welded repairs are allowed to the engine mounting area at the crankcase base and additionally to one (only) of the ignition coil mounting posts, provided that this does not change the position or thread size of the post. No other welded repairs are permitted.

24. Crankcase side cover

Must be standard unmodified and positioned with both standard, unmodified dowels in place. T1 and T2 side covers are interchangeable.

25. Gaskets

All gaskets must be standard unmodified. Where there is any doubt about the eligibility or suitability of a particular gasket it should be compared with a new item from the manufacturer.

26. Clutch

A dry, air-cooled centrifugal clutch of Noram, Horstman, Magnum, Maxtorque 1600 or 4000 series type (or any other clutch subsequently introduced which satisfies the same criteria), must be used to transmit the drive. The clutch should be in standard form (as supplied), be incapable of adjustment in position and have a maximum engagement speed of no more than 2,500 rpm engine speed. For clarification, shoe and drum type clutches only are permitted, plate clutches are not allowed (see Appendix 3).

The ABkC reserves the right to make amendments at any time during the year in order to equalise performance between the T1 and T2 engines, or to otherwise adjust the performance of either or both engine types. Any new regulation will come into force one month after the publication of updated regulations, subject to MSA approval.

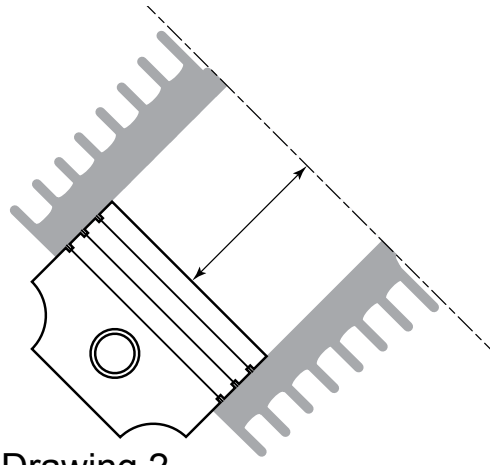
NOTES

Unless otherwise stated T1 component on left, T2 on right
Measurements marked * are nominal, and only for guidance in determining differences between engine types. Other dimensions are absolute for scrutineering purposes.

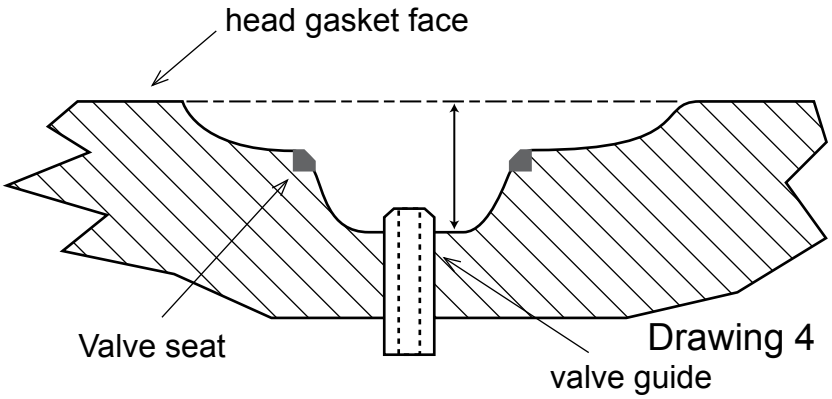
Appendix 1

PN 16166-ZH8-W50 PN 16166-ZH8-810 PN 16166-Z4M-922

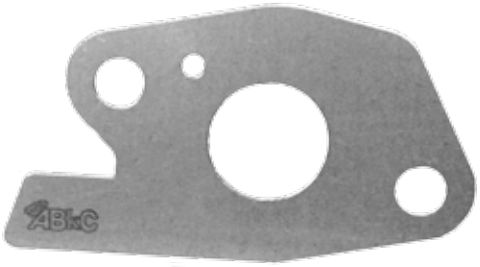
Drawing 1



Drawing 2



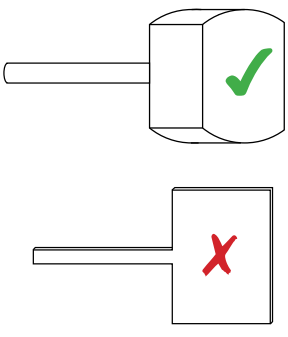
Drawing 4



Official ABkC restrictor plate

Drawing 3

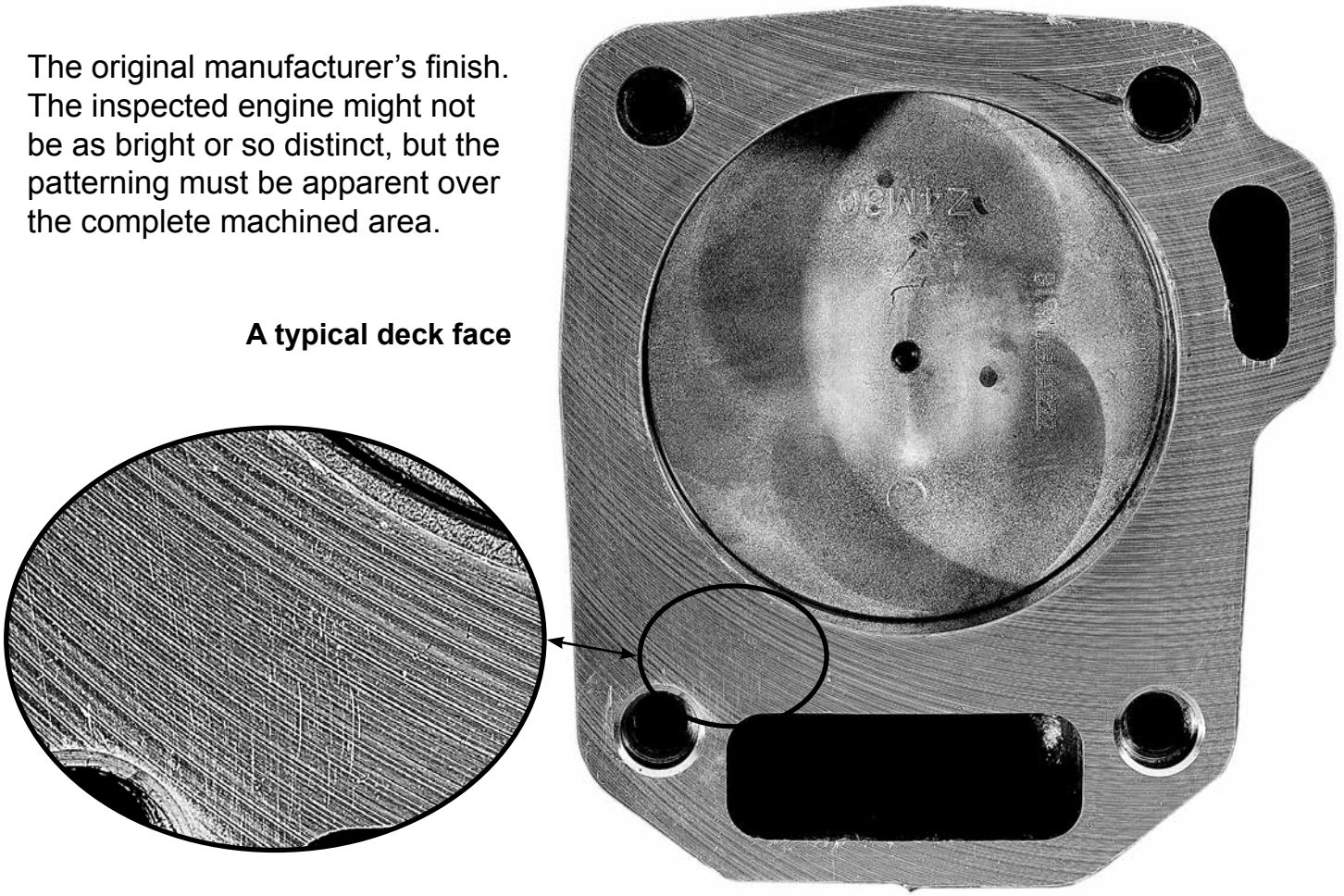
Note 1
In all the carbs the bore is cast, not machined, and therefore can be a little out of true. If measuring this bore, it is safest to use a semi circular gauge, rather than a flat plate gauge.



Appendix 2

The original manufacturer's finish. The inspected engine might not be as bright or so distinct, but the patterning must be apparent over the complete machined area.

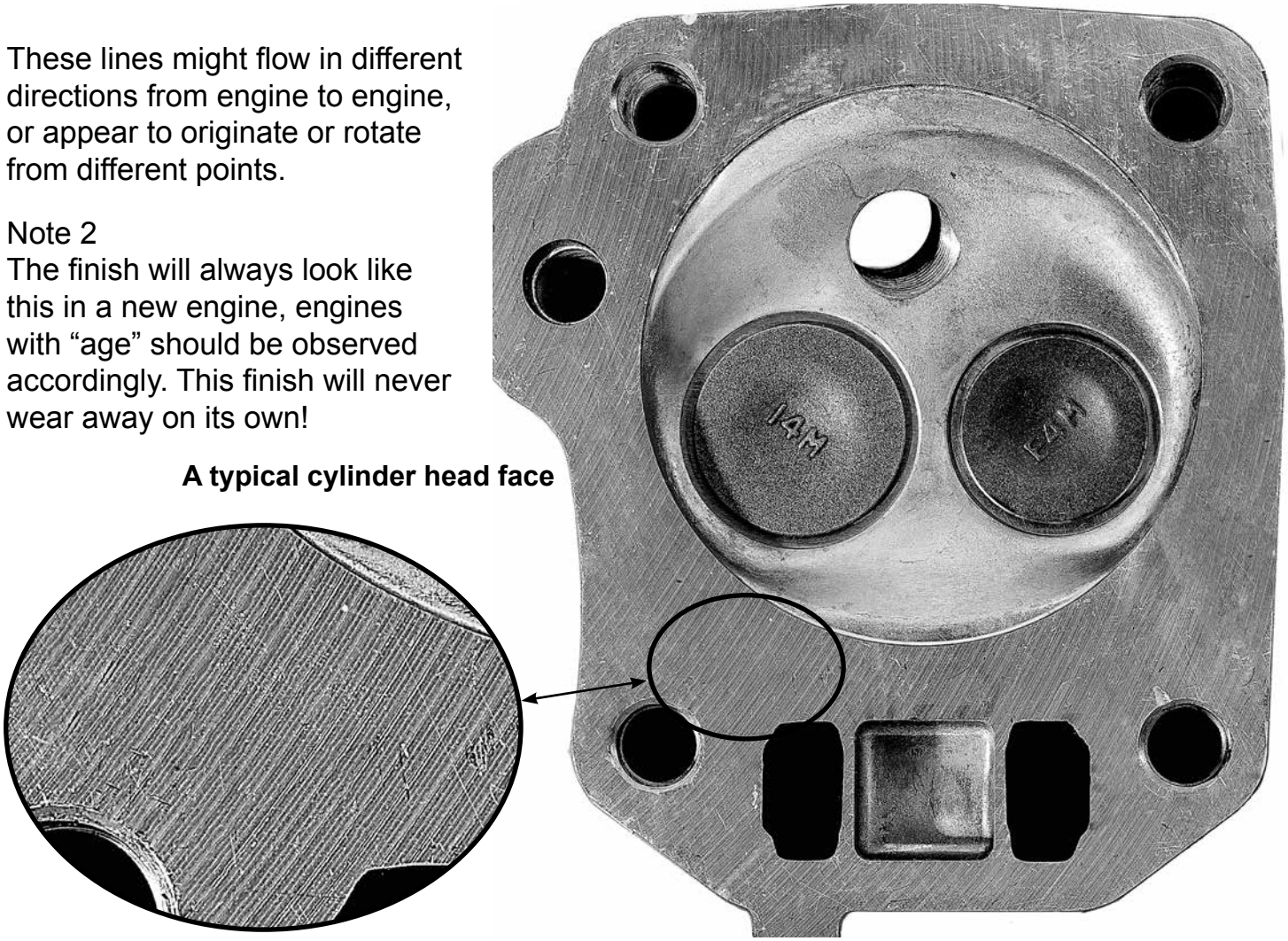
A typical deck face



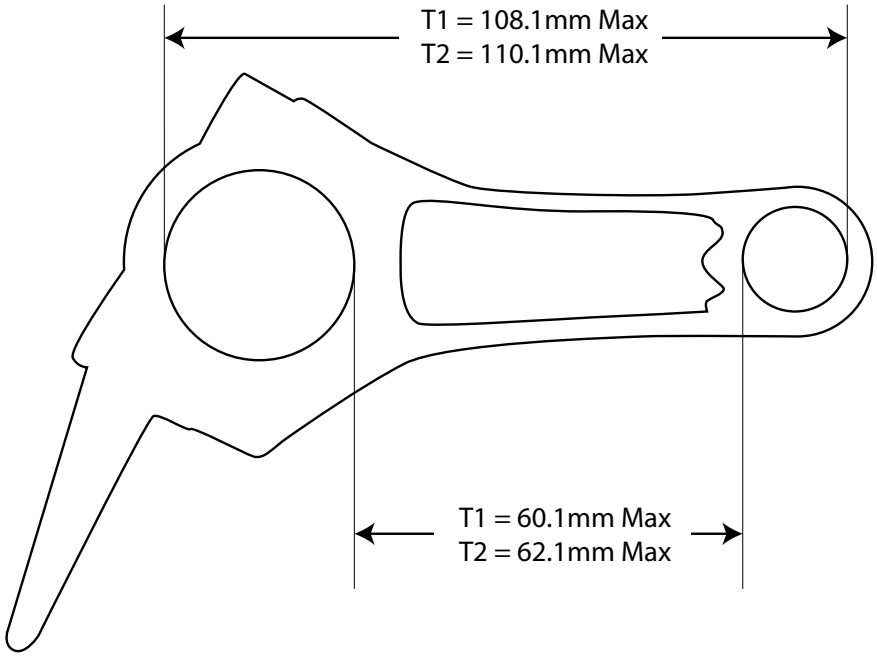
These lines might flow in different directions from engine to engine, or appear to originate or rotate from different points.

Note 2
The finish will always look like this in a new engine, engines with "age" should be observed accordingly. This finish will never wear away on its own!

A typical cylinder head face



Appendix 3



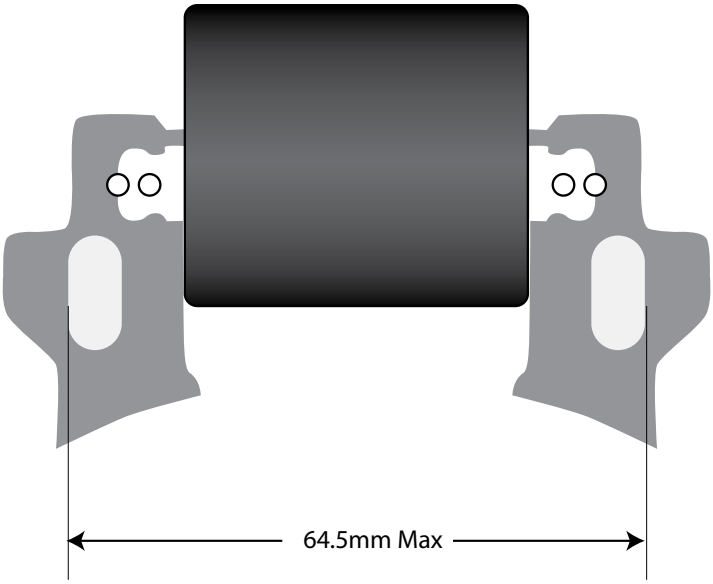
Connecting rod maximum dimensions

Example of drum-type clutch

✓

Example of plate-type clutch

✗



Maximum dimension, ignition coil mounting plate